Amendments to the Claims:

Status of Claims:

Claims 1-8 and 38-41 are pending for examination.

Claims 1-8 are amended herein.

Claims 9-37 were previously withdrawn.

Claims 1, 38, 40, 41 & 42 are in independent form.

1. (Currently Amended) An interferometer apparatus ~~An interferometer system having polarization sensitivity,~~ comprising:

a reference arm providing a delay line for a first electromagnetic energy, the first electromagnetic energy being light;

a sample arm providing a path for an incident electromagnetic energy to a sample, the incident electromagnetic energy being light, the incident electromagnetic energy being associated with the first electromagnetic energy, the incident electromagnetic energy having prescribed polarization characteristics ~~to a sample~~, the sample arm including a polarization adjusting device to control the prescribed polarization characteristics; and

a detector arranged to detect electromagnetic energy from the delay line and to detect light remitted from the sample,

where the interferometer apparatus is to illuminate the sample with illumination at a series of polarization states and to measure light remitted from the sample according to the series of polarization states.

2. (Currently Amended) The interferometer apparatus of claim 1, ~~A polarization sensitive optical coherence tomography system, comprising the interferometer of claim 1, wherein the electromagnetic energy is light, and further~~ comprising a beamsplitter directing light from a source to the reference arm and to the sample arm and for combining light from the reference and sample arms to direct the combined light to the detector.

3. (Currently Amended) The apparatus of claim 1, where to measure light remitted from the sample according to the series of polarization states comprises measuring birefringence ~~system of claim 1, wherein the sample arm includes a polarizer and a polarization adjusting device.~~

4. (Currently Amended) The apparatus of claim 1, ~~system of claim 3,~~ where~~in~~ the ~~polarizer comprises a linear polarizer and the~~ polarization adjusting device comprises an adjustable waveplate and a linear polarizer.

5. (Currently Amended) The apparatus of claim 1 ~~system of claim 3~~, where~~in~~ ~~the polarization adjusting device comprises an addressable waveplate~~ to measure light remitted from the sample according to the series of polarization states comprises measuring fast axis orientation.

6. (Currently Amended) The apparatus ~~system~~ of claim 1, wherein the reference arm is absent polarization adjusting components.

7. (Currently Amended) The apparatus ~~system~~ of claim 1, ~~further wherein~~ where the detector comprises a photosensitive detector, a lock-in device and a computer for analyzing signals detected by the detector.

8. (Currently Amended) The apparatus ~~system~~ of claim 1, ~~further comprising further~~ comprising a drive for determining the polarization states of incident electromagnetic energy directed to the sample and detected by the detector.

9. (Withdrawn) A retrofit apparatus for making an optical coherence tomography (OCT) system polarization sensitive, comprising a polarizer and a polarization adjusting device positionable in the sample arm of the OCT system.

10. (Withdrawn) The apparatus of claim 9, wherein the polarizer comprises a linear

polarizer.

11. (Withdrawn) The apparatus of claim 9, wherein the polarization adjusting device comprises an addressable waveplate.

12. (Withdrawn) A method of retrofitting an optical coherence tomography (OCT) system for polarization sensitivity, comprising inserting in the sample arm of the OCT system a polarization state determining apparatus.

13. (Withdrawn) The method of claim 12, said inserting comprising placing the polarization state determining apparatus in the sample arm to determine the polarization state of incident illumination probing a sample and a corresponding polarization state for detection of remitted electromagnetic energy from the sample.

14. (Withdrawn) The method of claim 11, said inserting comprising placing a polarizer and a polarization adjusting device in the sample arm.

15. (Withdrawn) The method of claim 14, said placing comprising placing a linear polarizer and a wave plate.

16. (Withdrawn) The method of claim 14, further comprising carrying out the inserting step with respect to the sample arm while excluding the placing of a polarization state determining apparatus in the reference arm of the OCT system.

17. (Withdrawn) A method of making polarization sensitive optical coherence tomography measurements, comprising

directing light from a source in a delay line and to a sample while selectively

determining the polarization state of light directed to the sample,

combining light received from the delay line and light from the sample, and

detecting the combined light.

18. (Withdrawn) The method of claim 17, further comprising mathematically analyzing the information from the detected combined light to characterize the sample.

19. (Withdrawn) The method of claim 17, wherein said directing light from a source in a delay line comprises directing such light without substantially altering polarization state of such light.

20. (Withdrawn) The method of claim 17, said directing light from a source to a sample, comprising selectively altering the polarization state of the light directed to the sample.

21. (Withdrawn) The method of claim 20, said selectively altering comprising providing polarized light to a waveplate and adjusting the a waveplate.

22. (Withdrawn) The method of claim 21, said providing polarized light comprising providing linear (plane) polarized light to the waveplate, and said adjusting comprising adjusting the optical characteristics of the waveplate to change polarization state of light incident on the sample.

23. (Withdrawn) The method of claim 17, further said combining light comprises combining with light from the delay line light from the sample having substantially the same polarization state as the light illuminating the sample.

24. (Withdrawn) A method to present measured data from OCT comprising using an HSV color scale such that three parameters are used and plotted, whereby reflectance is mapped into saturation and value and retardance is mapped into hue.

25. (Withdrawn) A Method of making polarization sensitive optical coherence tomography measurements, comprising:

directing light from a source to a delay line and to a sample while selectively determining the polarization state of light directed to the sample;

combining light received from the delay line and light from the sample;

detecting the combined light; and

based on the detected combined light, calculating (i) total reflected power, (ii) net retardance, and (iii) net fast axis for at least three different polarization states.

26. (Withdrawn) The methods of claim 25, wherein directing light from a source in a delay line comprises directing such light without substantially altering polarization state of such light.

27. (Withdrawn) The method of claim 25, wherein directing light from a source to a sample, comprises selectively altering the polarization state of the light directed to the sample.

28. (Withdrawn) The method of claim 27, said selectively altering comprising providing polarized light to a waveplate and adjusting the a waveplate.

29. (Withdrawn) The method of claim 28, wherein providing polarized light comprises providing linear (plane) polarized light to the waveplate, and said adjusting comprising adjusting the optical characteristics of the waveplate to change polarization state of light incident on the sample.

30. (Withdrawn) The method of claim 25, wherein combining light comprises combining with light from the delay line light from the sample having substantially the same polarization state as the light illuminating the sample.

31. (Withdrawn) A method of generating an optical coherence tomography (OCT) image comprising:

directing light from a source to a delay line and to a sample while selectively altering the polarization state of the light directed to the sample;

combining light received from the delay line and light from the sample;

detecting the combined light; and

based on the detected combined light, presenting measured data using an HSV color scale such that three parameters are used and plotted, whereby reflectance is mapped into saturation and value and retardance is mapped into hue.

32. (Withdrawn) The method of claim 31, wherein selectively altering comprises providing polarized light to a waveplate and adjusting the a waveplate.

33. (Withdrawn) The method of claim 32, wherein providing polarized light comprises providing linear (plane) polarized light to the waveplate, and wherein adjusting comprises adjusting the optical characteristics of the waveplate to change polarization state of light incident on the sample.

34. (Withdrawn) The method of claim 33, wherein combining light comprises combining with light from the delay line light from the sample having substantially the same polarization state as the light illuminating the sample.

35. (Withdrawn) A method of examining tissue of interest using an optical coherence tomography system having a light source, a reference arm, a sample arm including a polarizer and an addressable waveplate, and a single detector, said method comprising:

sequentially directing light having at least three incident polarization states from a source to a delay line and to a sample,

for each of the at least three incident polarization states, combining light received from the delay line and light from the sample,

using a single detector, detecting the combined light; and

for each of the at least three polarization states, calculating (i) total reflected power, (ii) net retardance, and (iii) net fast axis based on the detected combined light.

36. (Withdrawn) The method of claim 35, further comprising:
encoding polarization data in a light signal amplitude.

37. (Withdrawn) The method of claim 36, wherein said encoding includes directing light through a polarizer and an adjustable waveplate before and after said light reaches the sample.

38. (Previously Presented) An interferometer system having polarization sensitivity, comprising

a reference arm providing a delay line for electromagnetic energy;

a sample arm providing a path for incident electromagnetic energy having prescribed polarization characteristics to a sample, said sample arm including a polarizer and a polarization adjusting device that is selectively operable to modulate polarization; and

a detector arranged to detect electromagnetic energy from the delay line and from the sample.

39. (Previously Presented) The interferometer system of claim 38, said polarization adjusting device being operable selectively to determine the polarization states of light directed to the sample.

40. (Previously Presented) An interferometer system having polarization sensitivity, comprising

a reference arm providing a delay line for electromagnetic energy;

a sample arm providing a path for incident electromagnetic energy having prescribed polarization characteristics to a sample, said sample arm

including a polarizer and a polarization adjusting device that is operable to modulate continuously such polarization; and

a detector arranged to detect electromagnetic energy from the delay line and from the sample.

41. (Previously Presented) A method of making polarization sensitive optical coherence tomography measurements, said method comprising:

in a reference arm, providing a delay line for electromagnetic energy;

in a sample arm, providing a path for incident electromagnetic energy having prescribed polarization characteristics to a sample, selectively modulating the polarization to determine the polarization states of the electromagnetic energy directed to the sample; and

detecting electromagnetic energy from the delay line and from the sample.

42. (Previously Presented) A method of making polarization sensitive optical coherence tomography measurements, said method comprising:

in a reference arm, providing a delay line for electromagnetic energy;

in a sample arm, providing a path for incident electromagnetic energy having prescribed polarization characteristics to a sample, continuously modulating polarization of electromagnetic energy directed to the sample; and

detecting electromagnetic energy from the delay line and from the sample.